TRAFFIC ACCIDENTS

Chronic Medical Conditions As a Cause

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■ *From comparatively scanty information, an increased traffic accident risk appears to be associated with several chronic medical conditions including alcoholism, cardiovascular disease, epilepsy, diabetes and mental illness. Further study probably will show that medical handicaps other than alcoholism are a factor in from 5 to 10 per cent of traffic accidents. However, in about half of the accidents caused by heart attacks, the individual has no previous knowledge of his illness, and prevention of the accident would not be possible. A selective program for identifying high risk drivers with medical conditions is feasible and warranted, but a program of mass medical examinations for all drivers is not.*

A very strong relationship has been shown between drunk driving and traffic accidents, and 50 to 75 per cent of all severe and fatal traffic accidents involve the use of alcohol. However, studies have shown that drivers with alcoholism rather than social drinkers represent the preponderance, but not the entirety, of those who get into trouble. A major reduction in the traffic accident toll may thus depend on the early identification and treatment of alcoholism.

THE RELATIONSHIP between chronic medical conditions and traffic accidents is a subject of considerable controversy. At one extreme the State of Pennsylvania has initiated a program of medical examinations for all drivers. At the other extreme any such program has been labeled as an exercise in futility. Dr. William Haddon, one of the country's leading accident researchers, has expressed doubt that the aggregate of medically precipitated traffic accidents is as great as many believe. Even if it were, he feels that adequate testing and regulatory procedures would be almost impossible to devise. One thing is certain: Opinion has far exceeded useful research.

Before examining some of the current practices, and the fact and opinion on which they are based, let us identify some of the human requirements for operating a motor vehicle. These can be divided into five categories:

1. A basic minimum of strength and mobility,
2. Ability to see and concentrate adequately on the roadway and traffic,
3. Ability to interpret and make judgements about real or impending changes in the traffic situation,
4. Knowledge of traffic laws,
5. Knowledge of the mechanics and, to a lesser extent, the physics of driving.

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The medical aspects of driving fall into the first three categories. We can broadly divide medical disabilities into organic conditions which affect strength and movement, organic conditions which affect vision, concentration, and occasionally judgment, and psycho-social conditions which primarily affect interpretation and judgment. Several questions must be asked about these conditions and their relationship to accidents:

1. What proportion of the driving population can be expected to have these conditions?

2. What is the risk per vehicle-mile of having an accident resulting from the condition?

3. What proportion of the total number of accidents can be attributed to these conditions?

4. Can a program be devised to identify persons with an increased accident risk early enough in their driving experience to bring about a reduction in accidents?

5. If these persons can be identified, can the motor vehicle departments regulate their driving in such a manner as to reduce accidents?

Each of these questions has been the subject of wide disagreement. Perhaps the easiest to answer, however, is the first. The medical literature is replete with estimates of the number of persons with various medical conditions. The National Health Survey and the California Health Survey have provided useful information about the number of conditions to be expected in persons of driving age. Based on these, West[9] estimated in 1963 that in California there were 100,000 persons of driving age with heart disease, 40,000 with epilepsy, 80,000 with diabetes, 160,000 with a history of admission to a state mental hospital during the preceding 10 years, 700,000 problem drinkers, 410,000 with orthopedic handicaps and 630,000 with impaired vision or hearing. In California, about 85 per cent of the driving age population is licensed, and one might expect a somewhat lesser percentage among persons with medical conditions. Probably a reasonable estimate is that at least 15 per cent of drivers have one or more of the above conditions other than alcoholism and 6 per cent have alcoholism.

The question of risk of an accident per vehicle-mile is still very much unanswered. Only two studies[3,5] have been done in which the number of miles of driving was taken into consideration. In one of them[3] it was found that drivers with alcoholism had twice as many accidents per vehicle-mile as did other drivers. Our study of persons with medical conditions who were known to the California Department of Motor Vehicles[5] showed that drivers with heart disease, stroke, epilepsy, diabetes, mental illness and alcoholism had approximately twice as many accidents per vehicle-mile as did a group of drivers not known to have these conditions. Drivers who had been convicted for illegal use of drugs had almost twice as many violations, but no more accidents, than did drivers in the comparison sample. It must be emphasized that this study is of persons already known to the Department of Motor Vehicles, and no conclusions can be drawn about the accident risk of persons not known to the motor vehicle authorities.

The actual proportion of medical episodes in the total number of accidents currently is unknown, but it is possible to estimate the probable maximum and minimum percentages to be expected. If one were to use our figures for the California sample described above, and were to apply them to the unreported drivers with these conditions, the maximum proportion of traffic accidents attributable to chronic medical conditions (other than alcoholism, which will be discussed later) would be 15 per cent. In other words, 15 per cent of the drivers could be expected to have 30 per cent of the accidents, of which half would be attributable to a medical condition. A recent study from Canada[10] suggests that 3 to 4 per cent of accidents are caused by medical episodes. I suspect that further studies ultimately will reveal that chronic medical conditions other than alcoholism are a factor in from 5 to 10 per cent of all traffic accidents. While this is not a very large proportion of the accidents, it may add up to from 2,000 to 4,500 deaths a year and many thousands of injuries for the entire country.

But is it possible to identify these drivers before they have too many accidents? Pennsylvania has initiated a program of medical examinations for all drivers by their family physician. We do not feel that such a system is warranted because in California it would require 17,000 medical examinations a day, and because physicians, while quite concerned about traffic safety, often tend to underestimate the extent to which their own patients have a handicap to driving. In addition, for about half of the traffic accidents involving a heart attack, the individual did not know previously that he had heart disease.[1]

The California system, like that in several other states, requires that physicians must report any patient who has recurring episodes of loss of consciousness, and that everyone who applies for a license or for renewal must indicate whether he has had such episodes or any other condition which may handicap his driving. In our recent study[5] we found to our surprise that, in California, at least 75 per cent of the new cases of epilepsy in adults, and fewer cases of other medical conditions, were being reported to the Department of Motor Vehicles through these two mechanisms and through reporting of people who have had an accident because of a medical episode.

Kentucky, following a modification of recent American Medical Association recommendations, is evaluating a new system for identifying drivers with a medical handicap. Medical examinations are required in three types of situations:

1. When a license applicant has an obviously impaired physical function,
2. When a driver has had three accidents within a 24-month period,
3. When a driver suggests that he "blacked out" or that medical problems contributed to his accident.

The initial evaluation of this program indicated that at least half of the drivers with three accidents in two years were found to have a serious medical condition. It is our feeling that a selective screening program, such as is used in California, Kentucky and several other states, is more realistic than is the Pennsylvania approach.

What to do with the impaired driver, once identified, presents still another problem. While the driving license legally is considered a privilege, in many areas of the state it also is almost a necessity. In California, persons with medical handicaps who come to the attention of the Department of Motor Vehicles are interviewed, and information from their physician is carefully reviewed, sometimes with the aid of the local medical society traffic safety committee. About 50 per cent of the drivers are deemed to have a sufficient handicap to require revocation of the license for a time. Many of these persons have the license returned if their condition improves. However, they are still kept under close medical surveillance. This system appears to be working well and it is followed in many other states also.

The subject of drinking and driving deserves special attention. Many studies have been done which strongly implicate alcohol in traffic accidents, but only eight meet good research requirements by having a comparison sample and by comparing accidents during a similar amount of driving exposure. These studies, discussed in a recent communication,[7] revealed that:

1. There is a strong association between the use of alcohol and the occurrence of traffic accidents. With a blood alcohol level of 100 mg per 100 ml (0.10 per cent by weight) the risk of having an accident is increased about 10 times. At 150 mg per 100 ml, the risk is increased 25 to 50 times. This increase in risk has been shown for drinking drivers, for persons known to have alcoholism, and for pedestrians.

2. Somewhere between 50 and 75 per cent of all fatal traffic accidents involve the use of alcohol. Since alcohol-related accidents tend to be more severe than accidents not involving drinking, the proportion of fatal accidents involving alcohol is much greater than the proportion of minor accidents involving alcohol.

3. It can be shown by laboratory studies that many persons are impaired with blood alcohol at 50 mg per 100 ml and that virtually everyone is impaired at 100 mg per 100 ml. However, in the vast majority of traffic fatalities involving alcohol the levels are much higher than that. In fact, the average in many studies is above 200 mg per 100 ml, a level at which most social drinkers would be "under the table."

This last fact has led a number of investigators to suspect that the major portion of the traffic accident toll where drinking is involved may well be associated with alcoholism rather than with social drinking. The various data to support this were recently reviewed.[6] It is well known that the very heavy drinker develops a substantial tolerance to intoxication, but only a minimal tolerance to impairment, and that it is possible for such a person to manipulate an automobile—although very poorly—when the average drinker would be so intoxicated that he could not even stand or remain conscious. Payne and Selzer, in a fascinating study,[2] suggested that drivers known to be alcoholic become more reckless in their driving after drinking, while social drinkers become more cautious. They also found,[4] in psychiatric interviews of 67 drunk drivers and their wives, that 72 per cent of the drivers were alcoholic. We are doing a similar study to find simpler methods than a psychiatric interview to screen drunk drivers for

alcoholism. A study of driver and pedestrian fatalities in San Francisco[8] has shown that 15 per cent of adults who were sober at the time of the accident had fatty changes or cirrhosis of the liver, whereas 62 per cent of those who had blood alcohol levels of 150 mg or more per 100 ml had such changes. Almost three quarters of the fatally injured persons who had been drinking had alcohol levels in this range.

Since it now appears that many of the traffic deaths are related to alcoholism rather than to the social use of alcohol, we can indeed say that chronic medical conditions play a very major part in our traffic toll. However, the key to control will not be a more punitive approach to the drinking driver but rather the recognition at an early point that he really is a driving drinker who needs referral to proper rehabilitation facilities if his compulsive drinking pattern is to change. Simultaneously, the heavy fine or the six-month suspension of the license of such a person must be replaced by an open-ended revocation of license until the condition improves.

Can such a system work? Never has it really been tried, but many workers in the field of alcoholism have observed that often it takes a major personal crisis to motivate the compulsive drinker to seek treatment. Judging from the anguish expressed by most people when the possibility of losing a license arises, revocation is indeed such a crisis.

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